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Section I

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IN THIS ISSUE

A Survey of Job Evaluation as Used by Industry in Determining Base Rates,

By Asa S. Knowles and Frederic C. Means 381

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EDITORIAL DEPARTMENT NOTE

As the authors of the article in this issue of the *Bulletin* point out, there are two factors to consider in arriving at the compensation for any job: the job itself and the man who fills the job. In the past, major emphasis has been placed upon the man, particularly his productivity. Through time and motion study and wage incentive plans much thought and effort has been expended in rating and compensating men on the basis of productivity and other factors. In comparison, much less consideration has been given to rating the job in order that each type of work in the plant may be compensated for in relation to the requirements of that type of work. Job evaluation is a method of rating jobs and developing related rates of pay. We believe our members will find the present article most helpful as a well-rounded presentation of job evaluation.

The joint authors of the article are Frederic C. Means and Asa S. Knowles. Mr. Means is a former student of Professor Knowles, having received his B.S. degree in Industrial Engineering last June from Northeastern University where Professor Knowles is Chairman of the Industrial Engineering Department. Since his graduation Mr. Means has been employed as Industrial Engineer with the Fellows Gear Shaper Co. of Springfield, Vt. In addition, while attending school, 1936-1938, he was employed in the Standards Department of General Radio Co. of Cambridge as a co-operative student.

Professor Knowles received his A.B. degree from Bowdoin College in 1930 and his A.M. degree from Boston University in 1935. In addition he studied for one year, 1930-1931, at the Harvard Graduate School. His business experience includes two years as Salesman for Knowles Co. and one year as Cost Accountant for the Cabot Mfg. Co. In 1931, he joined the faculty of Northeastern University, where he now occupies the position of Professor of Industrial Engineering and Chairman of the Department. Professor Knowles is active in the Society for the Advancement of Management, being at present Vice President of the Eastern Region, President of the Boston Chapter and Editor of the *News Bulletin*. During the Seventh International Management Congress he served as a member of the Secretariat and was Social and Tours Director. Professor Knowles has made several contributions to industrial literature. He is a member and Associate Director of our Boston Chapter.

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DECEMBER 1, 1938

A SURVEY OF JOB EVALUATION AS USED BY INDUSTRY IN DETERMINING BASE RATES

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JOB evaluation, like every other idea since the world was young, is the product of many minds. One man or group proposes, others change or refine; faults are pointed out and changed, weaknesses strengthened. Gradually the idea approaches perfection after having passed through many stages of time, understanding and popularity. Not unlike other ideas or movements, job evaluation has undergone and will continue to undergo changes, adjustments and processes of refinement. There are at present, however, three or four distinct plans of job evaluation in use, and still others that are combinations of two or more of these.

For some time there has been confusion not only as to what job evaluation means, but also regarding its significance to both industry and labor. In recognition of this situation, the Department of Industrial Engineering at Northeastern University undertook two years ago to make an impartial and unbiased survey of job evaluation as used in industry today. From the beginning this project has been an attempt to find out what is actually being done, to report this factually, and to criticize it constructively. In the final analysis answers to the following questions were sought: What is job evaluation? What is its origin and development? Is it worth while? Above all, is it practical?

To achieve these objectives a questionnaire was prepared and sent to a large number of forward-looking and progressive organizations in the United States.[1] It is felt that the results of this survey are significant, and if presented here will be useful to both industry and labor as well as educators in obtaining not only a better understanding of the subject and its progress to date, but also an insight into its importance as a tool of management.

[1] See page 392 for questionnaire results.

Before presenting a discussion of the various plans of job evaluation in use, the procedures under which they were developed, their practical applications, etc., as disclosed by the questionnaire survey, the authors have included a brief discussion of the history and definition of wages and wage components.

Wages and Wage Components

At the dawn of history, man made or killed whatever he needed and it was his. He either worked or starved, and was of necessity self-sufficient. Then came the beginnings of specialization, with one man a farmer, another a hunter or herder, and another a potter or perhaps a weaver. Through barter of his own surplus goods, each man gained from the other those things which he needed and could not provide for himself.

Somewhere, in the process of industrial evolution, was born that first entrepreneur who was to make his living not alone from his own toil, but also through the toil of others. It is quite possible that the first enterprise was a co-operative affair, each participant sharing in the results, with the leader getting a larger portion because he bore additional responsibility and directed activities.

As time matured men were paid for their work, first in goods, then in a more convenient substitute—money. Although some forms of piece work are ancient (such as the paying of woodsmen per cord of wood and harvesters per bushel of produce, etc.) most workmen have, until recently, been paid on a time basis. They have been paid so much per hour, day, week or year. Thus, a laborer was in part deprived of the incentive that existed when what he produced determined his gain. The system tended to fix the price of different classes of labor, subject to the law of supply and demand, and to eliminate consideration of individual differences in efficiency. Men found that from a short-term viewpoint, at least, it was not always necessary or advisable for them to work at capacity. As long as there were small towns and small establishments, however, there were self-respect, community standing and owner management, resulting in closer knowledge of the foibles of each worker, which served to act as a check upon too obvious soldiering on the job.

With the advent of the Industrial Revolution in the eighteenth

century and the rapid growth of both cities and factories, the inefficiency of the ordinary laborer, because of this lack of incentive, began to really make itself felt. Various methods of payment by some form of piece work were tried. Payment by the piece, however, requires knowledge of how much each piece is worth and what is a fair day's work.

Because piece rates were based on estimates, these methods did not work successfully. It has been only in the last half century and, particularly, since the advent of Frederick W. Taylor and his principles of scientific management, that better methods for measuring labor's output and setting rates permitted the industrialist to again give labor an incentive for greater effort and efficiency. The systems in use are not perfect. There have been many abuses, but, nevertheless, they represent a forward step. Today it is becoming more and more common to pay for work in which the output is capable of being measured with some form of incentive system.

Definition of Wages

"Wages are the aggregate earnings of an employee for a given period of time, such as a day or week, and are equal to the product of the hourly rate times number of hours, or product of piece rate times number of pieces, plus any premiums or bonuses earned."[2]

This seems to be an adequate definition of over-all wages, but for a clearer understanding of the situation, there are certain components which go to make up the total wage and should be defined. These components are:

1. Base Rate
2. Differential
   (a) Personal Factors
   (b) Premium

The *base rate* is that portion of the wage which is general for a certain class of labor. It represents only the minimum requirements necessary for a man to perform the job. It is the portion paid for the job and not the man doing it.

[2] L. P. Alford, Editor, *Cost and Production Handbook* (Ronald Press Co., 1934), p. 611.

This is emphasized by Professors Balderston, Karabasz and Brecht in their discussion of incentive systems. "The actual method of installation (of an incentive system) should have two major steps: first, the determining of standards of output (corresponding to given products, materials, machines, methods, and lot sizes); and second, the setting of base rates so that they will bear proper relation to each other and to the rates of other plants in the community. The former has been fully discussed under standardization and time study; the latter, ordinarily known as job evaluation or salary standardization . . . . deals not with men, but with jobs, and confusion on this point results in a maze of figures because of numerous differences among people."[3]

Job evaluation, then, is a tool of management for determining the relative difficulty and, therefore, worth of all jobs within an organization, usually by considering to what degree certain factors common to all jobs are present. It is equally effective, and necessary, for straight time, incentive or measured day work systems, and is used for establishing base rates.

Only by evaluating jobs in terms of base rates will figures be accumulated which are comparable from company to company and industry to industry. The goal of job evaluation is to find the relative worth of each job within a plant and to set up a schedule of these jobs, graduated according to difficulty, the base rates to coincide with this last.

The *differential* is that portion of the wage which allows for individual differences within a certain labor class. It distinguishes between job *requirements,* included in the base rate, and what the worker *is,* how completely he fills the job. Where men are working on a straight day rate, this portion includes, along with personal factors, an allowance for varying productivity between workers.

If careful records of each man's productivity are kept and periodic adjustments in the wage rate made, the so-called "measured day work" results.

If a piece-work system is in effect, the portion of the differential paid for productivity is known as a *premium.* Where a man is paid straight time, his nominal wage is made up of the base rate plus a differential (productivity being considered a factor of

[3] Balderston, Karabasz and Brecht, *Management of an Enterprise* (Prentice-Hall, Inc., 1936).

differential) usually known as a *day rate.* Where a man is on some form of piece-work system, particularly the guaranteed day-rate system, his nominal wage is made up of the base rate plus differential, the differential being made up of two parts, one part for *personal differences* and one part for productivity called *premium.* Pictorially, then, a man's wages would look like Exhibit 1 on page 386.

Since all systems of wage payment contain a component which compensates for the job alone and not the man doing it, it is evident that job evaluation is equally desirable and necessary under any wage payment plan. Whether the employer feels that men should be rated for personal differences and productivity is beside the point. He must know the relative worth of the jobs as shown by job requirements. The steps leading up to the determination of fair and proper wage compensation are as follows:

1. Motion-time study to learn standards of output and procedure.
2. Job analysis and specifications to learn job requirements.
3. Job evaluation to determine relative importance of job requirements.
4. Employee rating to allow for individual differences in fulfilling job requirements.

Item 4, employee rating, is at best debatable, but many conscientious employers may feel that it is necessary. Factors to be considered vary greatly but usually include some or all of the following:

1. Productivity (premiums take care of this in a piece-work system).
2. Other individual differences.
   - (a) Quality
   - (b) Dependability
   - (c) Versatility
   - (d) Age
   - (e) Character
   - (f) Loyalty
   - (g) Aggressiveness—Initiative
   - (h) Creativeness—Imagination
   - (i) Analytical Ability
   - (j) Enthusiasm
   - (k) Personality
   - (l) Number of Dependents
   - (m) Length of Service with Company[4]

[4] List of other individual difference from J. E. Waltera, "Rating the Job and the Man," *Factory Management & Maintenance Supplement,* June, 1937 (McGraw-Hill Publishing Co.).

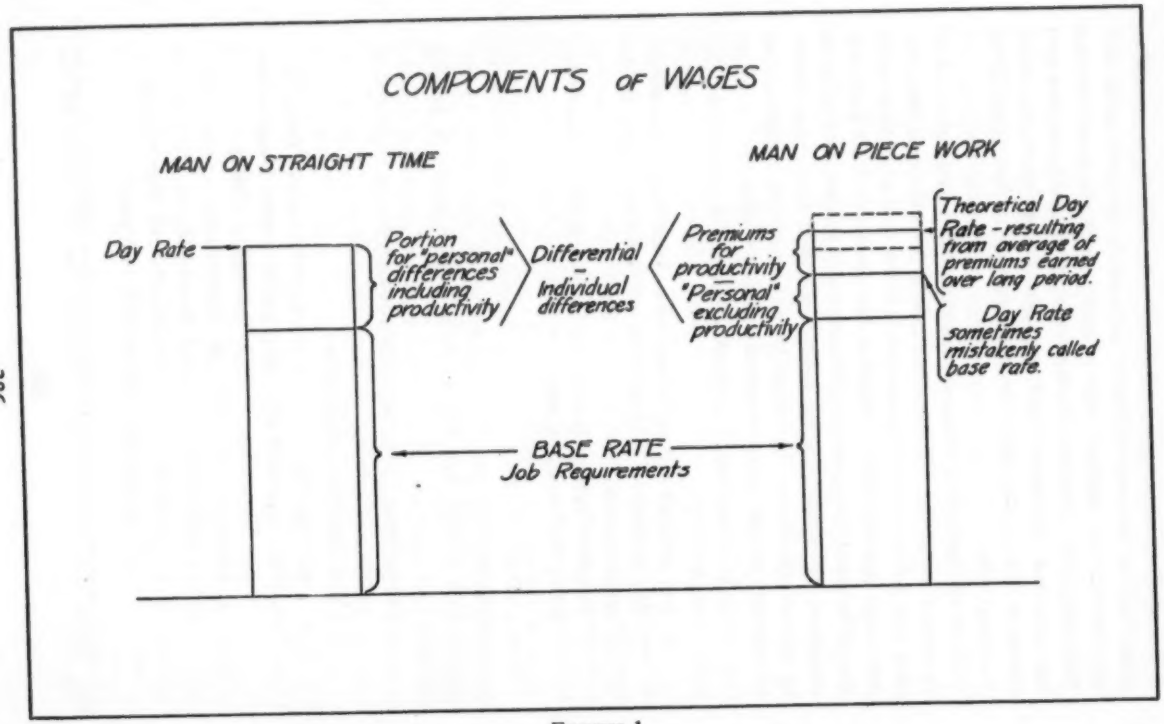
COMPONENTS OF WAGES
MAN ON STRAIGHT TIME
MAN ON PIECE WORK
Day Rate
Portion for "personal" differences including productivity
Differential
Individual differences
Premiums for productivity
"Personal" excluding productivity
Theoretical Day Rate - resulting from average of premiums earned over long period.
Day Rate sometimes mistakenly called base rate.
BASE RATE
Job Requirements

EXHIBIT 1

It is felt that the number of factors should be kept to a minimum, possibly three or four, which can be measured in some way other than pure judgment. Employee rating is a subject worthy of the attention of any student of wage systems, but the intent of this paper precludes any further discussion here.

The Job Evaluation Plans in Use

It has been stated already that there are three or four plans of job evaluation in use, and that others are combinations of two or more of these. There follows a brief description of the major differences in them, together with a brief discussion of their strong and weak points.

The Job Ranking System

The job ranking system is probably the simplest effective form of job evaluation and also the least expensive. It has been used throughout the organization of a large oil company with good results. In its simplest form, the names of all jobs are written on cards and a group of judges individually rank them in the order of their importance. Wage rates are assigned, usually by arbitrarily determining maximum and minimum hourly wages and then estimating relative worth of jobs in between. The ratings of the various judges are averaged with the result that the rank and, therefore, worth of the job is determined.

There are certain disadvantages to this system, and as practiced in this particular organization, it has been considerably refined. Jobs are analyzed before being rated. A job description is obtained directly from the employee. This is reviewed with him by his department head and all descriptions are more or less standardized as to wording and details to be included. All positions for the department are discussed with the industrial relations representative before the department head gives his final approval.

The revised position descriptions are tentatively arranged according to value of work, keeping in mind such factors as the following:

1. Difficulty of work
2. Volume of work

3. Responsibility involved
4. Supervision required
5. Supervision of others
6. Knowledge, training experience necessary
7. Conditions under which work is done

The next step is the preparation of a rough classification of jobs as to requirements and of maximum and minimum salaries for each group determined by those actually paid. The maximum limit set for each group is generally not greater than the minimum set for the second group above. A chart is made up showing the main groups and listing beneath the jobs included therein. From time to time, as conditions warrant or new light is thrown upon a particular job, there will be changes in the chart. It will, however, serve as a guide for keeping salaries in line and indicate lines of promotion and advancement. It will also tend to standardize job titles in different departments and in some cases eliminate diversity in names.

Job ranking, if done after thorough job analysis and specification, is a good way to evaluate jobs roughly, but it unquestionably has certain disadvantages. Some of these are: (1) unless care is taken, it will be a superficial ranking, there being no consideration of the factors fundamental to all jobs; (2) confusion is apt to result from job titles which are the same, although job requirements are not; (3) determination of the rate to be paid may be influenced too easily by existing wages; (4) all judges do not have equal knowledge of all jobs and, therefore, a great disparity in rank or rate may be apparent; and (5) since the final rate is in terms of dollars, it may not hold from time to time or from community to community, owing to fluctuations in money value or cost of living.

The Point System

"Under this system, arbitrarily established points are assigned for certain predetermined factors, such as age, physique, education, experience, etc. For example, points for the factors 'age' and 'education' might be assigned on the basis of the following scales:

Age	*Points*	*Education*	*Points*
Under 20 yrs.	0	Less than 6 yrs.	0
20 to 24 yrs.	1	6 to 7 yrs.	1
25 to 30 yrs.	2	8 to 9 yrs.	2
30 to 34 yrs.	3	10 to 11 yrs.	3
35 yrs. and over	2	12 to 13 yrs.	4
		14 to 15 yrs.	5
		16 yrs. and over	6

"This plan has the advantage that it requires some analysis of the task, but it is not wholly satisfactory because, (a) utter dependence is placed upon the arbitrary judgment of the individuals who decide upon the original factors and point scales; (b) it assumes that a considerable number of specific factors enter into the hourly rate for every job; (c) stress is placed upon a comparison of disparate factors constituting a job, rather than upon comparison of similar factors found in many or all jobs; and (d) in practice, jobs stressing the factors for which, say, six points maximum can be assigned, will be unduly valued as against jobs stressing factors for which, say, three points maximum may be given. To overcome this last objection, some investigators have gone to the other extreme and allowed an equal number of points for all factors, which is, of course, equally weak in an opposite manner."[5]

The Weighted Point System

Although all the systems discussed here have contributed to better practice in job evaluation, the weighted point system, as developed by Merrill R. Lott and presented in his book[6], has probably been the most significant. It is recommended as required reading for those interested in job evaluation. He sets forth four distinct steps:

1. Distinguishing between the importance of the various factors named;
2. Determining the extent to which each factor enters into the various lines of work for which the wage rates are being established;
3. Computing an index figure whose numerical value will express the wages; and
4. Interpreting the index figure into actual wage rates.

Briefly, Lott's plan is to determine the fundamental factors common to all jobs. He lists fifteen factors and distributes 1,000

[5] Engene J. Benge, "Gauging the Job's Worth," *Industrial Relations* (Vol. III, Nos. 2-3-4).

[6] Merrill R. Lott, *Wage Scales and Job Evaluation* (The Ronald Press Co., 1926).

points over these. The individual who does the rating, selects the estimated number of points to be assigned to each of the job factors. The total points for each job are then transferred into cents per hour by determining the value per point from existing wage levels.

Two samples of Lott's point distribution are here shown:

FACTOR NO. 1

Time Usually Required to Become Highly Skilled in an Occupation.

Years Required	*Points Allowed*
10 or more	230
9 to 10	207
8 to 9	184
7 to 8	161
6 to 7	138
5 to 6	115
4 to 5	92
3 to 4	69
2 to 3	46
1 to 2	23

FACTOR NO. 2

Time Usually Required for a Skilled Person in the Occupation to Become Adapted to the Employer's Needs.

Time Required	*Points Allowed*
3 or more yrs.	70
2½ to 3 yrs.	63
2 to 2½ "	56
1½ to 2 "	49
15 to 18 mos.	42
12 to 15 "	35
9 to 12 "	28
6 to 9 "	21
3 to 6 "	14
3 mos. or less	7

The allocation of points to the various factors was accomplished by the pooled judgment of a competent group of men. As outlined it had certain minor disadvantages, but fundamentally it was sound. The disadvantages are listed here (the method of overcoming them will be shown later): (a) in converting the point ratings into cents per hour, it is assumed that the lowest paid and highest paid jobs are in correct relationship to each other; and (b) it was found that fifteen factors needlessly involved the evaluation work and the number could be reduced without impairing the efficacy of the plan.

The Benge System

This system, as developed by Eugene J. Benge and described in a series of articles,[7] has also contributed to the science of evaluating jobs. After such research and experimentation, he has advanced the following principles for carrying on job evaluation:

1. The evaluation scale should be expressed in cents per hour, not in points.

[7] Eugene J. Benge, *Op. Cit.*

2. The number of factors upon which job judgment should be based should not exceed seven.
3. Job specifications should be subdivided into the same categories as the evaluation scale.
4. There should be no upper limit to the amount allowable for a given factor, so providing a scale sufficiently flexible to take care of new jobs, and the extreme importance of a single factor (as the hazard of the overhead lineman's job).
5. There should be some means of comparing each factor of a particular job *against that factor* in comparable jobs, rather than against a predetermined scale for that factor.
6. Repeated judgments of a group of competent persons, using the job specifications, and spread over a considerable period of time, should be pooled to yield the final figures.

Items 3, 6 and, particularly, 5, were well worth greater consideration than had previously been accorded them. Some means for readily comparing each factor against the like factor in other jobs is essential if pure judgment is to be limited and, in so far as possible, eliminated.

Item 1, however, seems to be a backward step. If ratings are in points rather than in cents, money fluctuations or changes in cost of living will not affect the ratings. This system, together with examples, will be discussed in more detail in presenting the general procedures used in job evaluation.

Summary

To sum up, the purpose of the foregoing presentation of job evaluation plans has been merely to outline the principles underlying each of the four plans in use today. There has been no attempt to prove that one system is better than another. Rather, the purpose has been to show that the best parts of each plan may well be used in good practice today. That seems to be just what is happening. All of these systems have made significant contributions to job evaluation and thereby aided in its development as a tool of management.

The General Procedure in Job Evaluation

Results of Questionnaire

Because there is already much material available on the theory of job evaluation, the questionnaire form sent to industry was

limited to finding out to what extent industry is carrying on job evaluation, and in the instances where work is being done, the nature and scope of the work, the methods used and their application.

All of the firms to which questionnaires were sent were selected from among those listed in Thomas' *Register of Manufacturers* and capitalized at $1,000,000 or over. Thus, this survey was not a random sample of industry as a whole. Of three hundred and fifty questionnaires sent out, there were eighty-five replies. Ten of these furnished no information of value, thirty-nine were not using job evaluation, and thirty-six were using or working on job evaluation. Of the latter, many sent descriptions of their work, together with samples in some instances.

Of the thirty-nine companies not using job evaluation, the following indications of how they determined wages should be of interest.

Companies Not Using Job Evaluation and Paying—

1. "The Going Wage"	11
2. Straight Piece Work	3
3. Some Form of Incentive	6
4. Some Combination of Above	19
TOTAL	39

Of the nineteen companies using some combination of the above, twelve companies are partially on straight piece work. At least twenty-eight of the thirty-nine companies realize the need for control of productivity in some manner and are accomplishing this by means of the pay envelope.

Results of the survey would indicate that 42.3 per cent of the companies replying use, or are working on, job evaluation. Among these, twenty-four report that jobs throughout their entire organization have been evaluated, while four report that jobs within certain departments have been rated.

If the companies not replying to the questionnaire are considered as not using, and possibly not having heard of, job evaluation, then only 10.3 per cent of the companies use this modern tool of management. It is known, however, that some of the com-

panies which did not reply are using job evaluation. For various reasons, they preferred not to disclose their work in this direction. It is believed that an additional 10 per cent, at least, did not reply. The probability is that at least 20 per cent of all companies are interested in some manner in job evaluation.

Replies to questionnaires are notoriously few and far between. If the results are 25 per cent of the total sent, they are considered as excellent. In this case the number of replies received was especially significant for two reasons: (1) there was absolutely no inducement for the company to reply; and (2) the subject is considered by many, in this day of troubled labor relations, to be a decidedly confidential one.

It should be made clear at this point that much of the information collected has been furnished upon a promise that the source be confidential. Therefore, proper credit cannot be given, nor can the extent to which the individual companies co-operated and the specific origin of certain charts and tables be disclosed.

Time-Motion Study and Job Analysis Precede Job Evaluation

At this point it is advisable to review certain portions of what has already been presented so that the reader may have in mind what job evaluation includes.

Job evaluation is a tool of management for determining the relative *worth* of jobs according to job requirements, i.e., the value of these jobs expressed in base rates of pay.

There are, however, other tools of management which should be developed first and used in conjunction with job evaluation. These are:

1. Motion-time study to set standards of output and procedure.
2. Job analysis and specifications to determine job requirements.

Motion-time study for setting standards of output and procedure, has been fully discussed elsewhere, so that there is no need to go into detail on that subject. Job analysis and specification has also been capably presented in other sources. It has not, however, been so universally accepted as has motion-time study; therefore, the need for it, its value and, particularly, its application to job evaluation, will be discussed later.

Who Does Job Evaluation?

The question of "Who Does Job Evaluation?" is purposely raised before the discussion of job analysis, even though it may, in view of the above outline, seem like putting the cart before the horse. If the committee which is to have charge of job evaluation is formed before job analysis is even considered, it can formulate policies of job specification in such a way as to be of utmost value when the time comes for evaluation. The work will have been done correctly and, therefore, need not be undone.

Who, then does job evaluation? The survey shows that in sixteen plants job evaluation is done by a committee selected from management and supervision only. In eight plants the committee includes workers as well as management and supervision. In three plants, once the fundamentals have been established, it is standard procedure for members of personnel or industrial engineering departments.

There is, then, one thing in common for all evaluation plans. The pooled judgment of a group of competent men is used in determining the method of procedure. In the past, the first step of this committee has been to make a survey of the various plans already in existence, with a view to using the best parts of each and profiting by other people's mistakes.

It would seem that there should be a master committee of approximately ten men, including members of the standards department, personnel department, industrial engineering department, factory and divisional superintendents and foremen, together with key workers or union representatives.

This master committee might be augmented from time to time by including specialists in certain classes of work, either subforemen or key workers. Membership in the master committee would be constant and they would determine policy. The additional members invited to sit in would serve in an advisory capacity and be varied from time to time according to the questions being considered.

Whether laborers or labor representatives should be included or not, is, of course, a debatable point. It is not necessary, but it is felt that if they are not, one of the best means of improving labor relations and, thus, one of the greatest benefits derived from job evaluation, has been overlooked. If employees are in

on the formulation of the plan and understand it, their acceptance will be almost assured. If, on the other hand, it is handed to them already made, there will quite probably be much doubt as to it fairness and worth.

Job evaluation is a beautifully logical system that will appear to the worker as being an honest effort toward meeting the problem of wage payment—*if that is the aim of the management.* Sweatshop operators would probably not be interested.

The job evaluation committee usually does one of two things: In a small company it may evaluate all jobs. In a large company it will evaluate certain representative or key jobs only and develop, in so far as possible, a fool-proof system for rating the rest of the positions. The evaluation, then, becomes standard procedure and this is what has happened in the three companies previously mentioned.

In any case, their procedure up to a point is almost exactly the same. It is as follows:

1. Classification and definition of jobs (Job analysis and specification)
2. Selecting common job factors
3. Selecting weights to be assigned to each factor
4. Drawing up rating sheets
5. Rating Jobs
   (a) All jobs in small factory
   (b) Key jobs in large plant
6. Conversion of point ratings into money values
7. Job Schedule Showing
   (a) Relative worth of each job
   (b) Lines of promotion and advancement
   (c) Deviation of present rates above or below standard
8. Formulation of policy in regard to adjusting rates that vary from standard.

Job Analysis and Specification

Engene Benge, in discussing his experience with job evaluation and the preliminary job analysis, said: "Ultimate statistics showed that in a force of 9,800 hourly employees, there were, according to existing classifications, 757 distinct jobs, and 70 different rates of pay between the lowest rate of $.415 and the highest rate of $.975 per hour. These initial figures were finally reduced to 294 distinct jobs and 14 different rates of pay."[8] Here is an example

[8] Eugene J. Benge, *Op. Cit.*

of the necessity for job analysis and the concrete benefits which may be derived from it. It seems evident that a large saving in clerical costs for payroll is one of the immediate benefits.

Still another example may be drawn from Merrill R. Lott's book.[9] Mr. Lott, in conjunction with two trade associations, made a survey of the hourly rates being paid first-class toolmakers. Since the trade associations drew their membership from the same local community, it would seem that the various employers had widely different mental conceptions of what constituted a first-class toolmaker. The figures reported are shown below.

WAGE REPORTS OF TWO DIFFERENT TRADE ASSOCIATIONS WHOSE MEMBERSHIP IS DRAWN FROM SAME LOCAL COMMUNITY

No. of Toolmakers Employed at Rate Shown	*Rate in Cents per Hour*	*Per Cent of Lowest Rate*
Association No. 1		
2	60	100
1	65	108
9	70	117
8	75	125
20	80	133
9	85	141
7	90	150
AVERAGE	79	
Association No. 2		
2	50	100
4	56	112
2	58	116
9	60	120
3	62	124
2	64	128
14	66	132
11	68	136
38	70	140
11	72	144
5	74	148
90	76	152
10	78	156
88	80	160
3	82	164
11	84	168
35	86	172
4	88	176
12	90	180
2	92	184
3	96	192
4	100	200
1	105	210
AVERAGE	77	

[9] Merrill R. Lott, *Op. Cit.*

Lott's experience proves the necessity for a wider understanding of just what a job comprises. It is probable that no two men could agree upon the hourly rate of a job unless they sat down and defined the job first. If they both have the same picture of a job, their ratings will tend to be remarkably close.

It is even more necessary, then, for a job evaluation committee to define each job and record its findings so that from time to time, as well as from man to man, a common understanding will be possible. Then, and only then, can intelligent ratings be made.

In most plants it is common to recognize two classes of workers. These are most often distinguished as "salary" and "hourly," or "office" and "shop." This study is concerned with hourly or shop workers. This is known as job evaluation, the other as salary standardization. Although the factors or weights assigned to them may vary, the fundamental principles are exactly the same.

The job classification and definition work may be done in one of several ways. Mr. W. R. Coley of Leeds and Northrup Company, in his address, "Job Analysis and Job Rating," delivered before the Scientific Apparatus Makers of America, December 8, 1936, lists three. These are:

1. Have each employee make out a questionnaire for detailed description of duties.
2. Have special job analysts question each worker or group of workers and by this interview develop the material to write job definitions.
3. Get original data from a qualified person in each division or department and have them remodeled by some individual to make them uniform as to length and then have them checked by a group of department heads.

Mr. Coley believed that the opinions of more qualified persons could be had by using the last method and that, therefore, it was the best.

Scott, Clothier and Mathewson, in *Personnel Management*,[10] tak a strong stand for the second method, that is, having job analysts do the interviewing. They point out that employee ques-

[10] Scott, Clothier and Mathewson, *Personnel Management* (McGraw-Hill Book Co., 1931), Chap. IX.

tionnaires have been found particularly unsatisfactory. They list the following facts that a good job description should contain:

1. Name of occupation.
2. Statement of duties, a brief written description.
3. Conditions of work including:
   (a) Location
   (b) Time
   (c) Posture, standing, sitting, etc.
   (d) Speed
   (e) Accuracy
   (f) Degree of automaticity
   (g) Health hazards
   (h) Accident hazards
   (i) Disagreeable features
4. Pay
   (a) Method
   (b) Rate
   (c) Bonuses, premiums
   (d) Penalties
5. Relation to other occupations (lines of promotion)
6. Sources of supply

Eugene J. Benge believes that specially trained interviewers are of greatest value here. He lists the instructions given to the interviewers as follows:

1. To interview employees in the five main departments of the company up to the rank of assistant foreman, so that every distinct job should be analyzed and the findings recorded.
2. To refrain from offering suggestions, either to employees or to supervisors, for improvement of working conditions or of methods, but to record such suggestions for later investigation.
3. To avoid preconceptions as to the importance of jobs, striving merely at this stage to record job facts.
4. To keep away from grievances and conflicts of all kinds.
5. To confine attention to the job itself, uninfluenced by the ability of the employee in the job.
6. To attempt to secure the genuine cooperation of the departmental supervisor before undertaking employee interviews.
7. To explain to each supervisor and employee the objects of the whole study before seeking job analysis data.

In undertaking to collect job analysis data, the staff considered the following possible methods:

1. To have job descriptions prepared by supervisors.
2. To send questionnaires to employees.

3. To bring employees from their workplaces for interview in the staff office.
4. To have job analysts interview employees at their regular workplaces.

For a number of reasons the Benge staff chose method four.[11]

The reader may find an excellent example of a combination job specification and job evaluation sheet by consulting the job evaluation manual used by the subsidiary companies of the U. S. Steel Corporation.[12]

One word of warning is in order before continuing to the discussion of job factors. The title of the jobs should be the same as those listed on the payroll; or what is more likely to happen, the payroll titles should be changed to coincide with job specifications, thereby eliminating much needless duplication.

Job specifications, or the requirements of the job, should be listed according to the degree in which the common job factors are present. An even better method, as developed by U. S. Steel Corporation, is to combine the job rating and job specification sheets. Duplication must be avoided as much as possible. Careful thought before initiating job evaluation will save much time and money.

What Are Fundamental Factors Common to All Jobs and How Determined?

Knowing standards of output and procedure and understanding the necessity for job analysis, the next step is to find the common factors upon which the committee will base its judgment of the job's value. These are the variable factors which, when evaluated, will give the base rates, or the relative worth of each job.

The number of factors used by the various companies studied varied from three to forty-three. There is not, however, as great a gap as seems apparent. The company listing forty-three factors, separates its factors into two general groups: "(1) job requirements, and (2) job conditions. Job requirements are still further divided into physical and mental. Physical requirements are again divided into strength (for hardest single effort in the job) and pace (measurement of effort expended by all mo-

[11] Eugene J. Benge, *Op. Cit.*, p. 37.
[12] U. S. Steel Corp., Ind. Eng. Dept., 26 Broadway, New York, N. Y.

tions performed during the working period). Mental requirements include degree of skill required, amount of responsibility, accuracy, judgment, and still others. Under job conditions are listed dust, heat, noise, monotony, eyestrain, and a number of other factors."

Careful analysis reveals that the number of *basic* factors used by this company is small but the variations in these have been noted and are listed for consideration on the job analysis sheet in an effort to reduce rating to a positive basis as well as to eliminate subjective judgment insofar as possible.

The table below shows the *basic* factors, those which really seemed to be inclusive, together with the variations encountered in the returns made by seventeen companies in answer to the aforementioned questionnaire. They have been combined and presented in this manner in an attempt to show that these factors are common to all jobs throughout industry in varying degrees.

TABLE OF FACTORS MENTIONED AND FREQUENCY

Main Factors	*Sub-Factors Included*	*Number of Times Mentioned*
Responsibility	For Equipment " Materials " Safety of others Supervision—given received Initiative—Honesty— Discretion—Integrity— Leadership—Count	17
Skill	Dexterity—Precision Versatility—Accuracy Variation—Sense of Time & Space Sense of Weight—Steady Nerves Accuracy of { Calculation, Measurement, Reading, Record, Selection, Time, Weight }	14
Mental Effort	Talent—Blue Prints— Ingenuity—Pace Complexity of operations Management ability Memory—Observation Originality—Planning Analysis—Adaptability Setups	14
Physical Effort	Acuteness—Strength Endurance—Difficulty Pace	14
Equivalent Education Required	Knowledge—Judgment Ability—Mental development	13

Main Factors	*Sub-Factors Included*	*Number of Times Mentioned*
Working Conditions	Hazards—accident, health Clothes spoilage—Disease Internal Injury—Fumes Heat { air / contact / radiation Noise—Wet—Eye strain Dirt—Dust—Tools Contact on body	13
Experience Required	Time required to break in Service—Age Previous experience Length training period	12
Fatigue	Monotony	4
Prevailing Wage		4
Opportunity for Future Advancement		3
Cost of Living		2
Profit of Company		2
Co-operation		1
Regularity		1

The average number of factors mentioned is seven. This, or at the most, eight, would seem to be the ideal number for job evaluation. It is evident that the first seven are considered to be the most important and include those named by several concerns, both large and small, who have done outstanding work in this field.

If too many factors are considered, the rating will become so involved as to defeat itself unless great care is taken. After a survey of comparable plants, the best method of determining these factors for the individual company would seem to be as follows:

1. Pick twenty or thirty key jobs, differing widely.
2. Give each man on the committee a list of these jobs with title and definition.
3. Have each man independently pick out the factors that he thinks are most important in each job.
4. Pool all these judgments and make a frequency distribution of each factor.
5. Pick seven or eight of the factors which occur most frequently.

A study of the first seven factors mentioned above will show that they divide themselves, roughly, into three groups, one having to do with possession, another with application, and a third with working conditions, indicating the effect on a man performing that job.

Thus, job requirements are as follows:

Job Requires Possession of:	*Job Requires Application of:*
Skill	Responsibility
Previous Experience	Physical Effort
Previous Education	Mental Effort
Action and Reaction	
Working Conditions	

In evaluating jobs, the three following questions may well be asked when doing the rating:

1. What does the job require a man to have?
2. What does the job require a man to give?
3. To what does the job subject a man?

The factors, opportunity for advancement, co-operation and regularity, are personal factors and should not be considered in job evaluation. The factors, cost of living and profit of company, should also be excluded. They will be considered after the jobs are rated when converting from point to money values.

Weighting of Factors

Although a few companies have no weighting system and do not believe in it, it would seem obvious that all factors are not of equal importance. Granted that the amount of a given factor inherent in a job varies from job to job, are all factors of equal importance when considering the worth of one job? Would it be likely that an employer would expect to pay an equal amount for responsibility (notoriously hard to find) and physical effort?

The consensus among those firms answering the questionnaire seems definitely to be: "No, all factors are not of equal importance." Accordingly, these firms have taken 100 or 1000 points, as the case may be, and distributed them among the various factors as shown in the following table.

MAXIMUM WEIGHTS GIVEN TO FACTORS BY VARIOUS COMPANIES
(BASIS OF 1000 POINTS)

Factor	*Firm*							
	A	*B*	*C*	*D*	*E*	*F*	*G*	*Average*
Responsibility ...	230	129	112	240	195	100	134	163
Skill	110	483	406	230	255	300	201	283
Mental Effort ...	60	64	63	100	109	86	201	98
Physical Effort...	60	64	63	60	136	155	101	91
Equivalent Education	140	130	156	100	123	138	113	129
Working Conditions	140	130	200	150	91	121	116	135
Previous Experience	260	—	—	120	91	100	134	101
TOTAL	1000	1000	1000	1000	1000	1000	1000	1000

Some companies distribute 1000 points over the factors, some 500, some 800. For the purpose of comparison, all have been converted into ratings on the basis of 1000 points. Thus, some of the above point assignments seem to be in very odd amounts.

Although in the past some companies have assigned money values to each factor, none of the companies answering the questionnaire now do so. Nineteen companies used the weighted point system and nine are using the straight job ranking system. Those with weighting systems assign a certain maximum number of points to each factor, as shown in the previous table, and when rating the job, check in the number of points considered to be present, or convert the various word descriptions into points. Thus, fluctuations caused by changes in the value of money or cost of living, will have no effect on the ratings. They merely necessitate determining a new money value per point and multiplying.

At the present writing, weighting seems to be somewhat of an individual problem, although it would seem safe to assume that the weights for a given industry might be standardized without too much difficulty. If the day ever comes when job name and specification, as well as factor definition, can become industry wide, doubtless it would be discovered that the main obstacle to agreement had been a misunderstanding in the meaning of terms.

At present, however, the safest way to proceed is by the pooled judgment of men qualified to rate each key job. Take the same job and have each judge rate it according to the maximum amount of the accepted factors necessary to do the job. On the basis

of these opinions, get the average maximum requirements for each job. Now have the judges rate these jobs as to which they think the most simple, which average, and which most difficult. Knowing, then, the general opinion of each job, weight the factors according to their importance. The factor which occurs most in the difficult job and least in the easy job should be given the most weight and vice versa. The other factors will be weighted at some intermediate point between these two.

Probably the simplest method of establishing these weights is by trial and error. If the judges can agree as to which of the sample jobs is easiest, average and most difficult, points may be assigned to the various factors in each job. Next, a trial job rating may be performed to see if the average jobs come out with a point rating approximately midway between the easy and the difficult. If not, the maximum points assigned each factor may be changed until they do, and the rest of the key jobs may be rated on this basis, checked and rechecked.

Rating Sheets and Manuals

Having determined the factors common to all jobs and their weights, the next step is to make a rating manual and/or a rating sheet for recording the rating of the job. It is at this point that the procedure for a large and small company may well differ.

In a large company it is impractical for the job evaluation committee to rate all jobs personally. Therefore, they draw up a job evaluation manual for the use of those men, usually staff members of the industrial engineering or personnel departments, who are to do the rest of the rating as standard procedure.

In order to achieve uniform results in the job ratings, care must be taken to describe the job rating plan in detail, include a short discussion of each factor, show the weights assigned each factor, and, even more important, include the list of key or bench mark jobs that the committee has evaluated, showing the points assigned to each factor for the various jobs.

It should be evident that if job evaluation is to become a standard procedure, as it has in many large companies, great care must be taken to describe and illustrate each factor and each step in the job evaluation process.

In smaller companies it is usually unnecessary to compile a manual with such extensive guide charts and instructions. Conditions are such that all jobs may be rated by the original job evaluation committee with much less red tape than in the large plant. Under these circumstances, the next step is not the development of a complete job evaluation manual, but rather of a job rating sheet only. At this point, also, it is well to make a record of the job evaluation procedure being used.

Although at first thought the development of a job rating sheet would seem the easiest part of the task, a little care here will save much trouble later. Since there is no manual as such, an attempt should be made to express the varying degrees of each factor in word pictures so that the rating will be simplified and the element of judgment reduced to a minimum. This, at the same time, will yield more uniform results from the different judges who are rating the given job, and tend to eliminate extremes of opinion.

On page 406 is shown a rating sheet developed by a small but progressive firm in order to meet this requirement.

Rating the Job

Whether the company be large or small, when the job evaluation committee has completed its ground work, the actual rating of jobs should be carried forward.

The question which arises at this point is: "Will this base rate be a base rate, or will it represent the actual hourly wage for the employee?" A glance at the first part of this paper will remind the reader that, theoretically, at least, the base rate should represent only what the job is worth and give no consideration for individual personality differences. There are, then, several methods of approach.

1. Set one base rate and let that represent the standard wage regardless of personal differences.
2. When evaluating jobs, set an upper and lower limit for each class of work. Determine where within this class, a man comes by means of a periodical employee rating.
3. Set one base rate and let that represent base rate or job requirement. Allow a certain percentage of the base rate

OCCUPATIONAL RATING

Occupation rated

_____

_____

Description_____

_____

✓_____

_____

_____

_____

Date_____

Rated by_____

DIRECTIONS FOR RATING

1. Place a check (✓) on each line to indicate minimum required to hold job at all.

2. Place a cross (+) on the line opposite each of the first three items to indicate the amount required to perform the occupation expertly.

								SCORE	
								Min.	Max.
1	Previous experience needed - time since starting work anywhere.	Less than 1 yr.	1 year	2 years	3 years	4 years	5 years or over		
2.	Educational background needed for average person	Finished grammar school.	2 yrs. High School or Bus. School	High School Diploma	High School & Technical study	College Degree	College & Technical training		
3.	Training time on job.	1 week	1 month	6 months	1 year	2 years	3 years or over		
4.	Factors producing physical fatigue	Combination sitting & standing.	Sitting continuously.		Standing continuously.	Stand, stoop & Lift under 50#	Stand, stoop & lift over 50#		
5.	Unusual problems demanding ingenuity	None (work wholly routine)	Routine & occasional trouble wkly.	Routine work & daily trouble	Routine work & Hrly trouble	50% of work not routine	90% of work not routine		
6.	Precision and accuracy required (A) For mach. work use (a) For assembly use (B)	Rough work 1/4"-1/32"		Tol .01	Tol .005	Tol .001	Tol .0005		
		Errors unimportant.		Errors cause trou-ble but can be caught	Errors cannot be caught but no money loss		Errors cannot be caught & money loss		
7.	Chance of damage to materials, parts, machines or customer's good will	Small chance of damage & low loss (under $50)		Small chance of damage & high loss (over $50)	Big chance & low loss (under $50)		Big chance & high loss over $50		
8.	No. of operations in the occupation	1	2	5	10	20	30 or more		

EXHIBIT 2

as a maximum for personal differences, as discussed earlier in this article. Determine what each man should earn above base rate by means of an employee analysis periodically.

All three of these methods are in use. Much may be said for and against each. Method number 1, however, tends to justify the criticism of one employer that job evaluation is too hard boiled. Either method 2 or 3 would seem to be more equitable and, undoubtedly, would meet with much better reception from labor even though only one or two cents per hour might be involved.

Method number 3 seems to be the least complicated and more nearly fits into the picture of what wage payment should be: a base rate for job requirements accounting for the largest portion, and a percentage of base rate allowing for the degree to which a man fulfills his job requirements.

Converting Point Ratings into Hourly Wages

The jobs have now been evaluated in points and are the standard base rates toward which we have been driving. Converting these point ratings into money values may be done in several ways:

1. Knowing the total amount of money that has been budgeted to labor for one year, the total number of points, arrived at by adding together the separate job ratings, may be divided into this budget figure and an annual value per point found; when this is multiplied by each job rating and divided by the expected number of work weeks, the weekly salary of each worker is derived.
2. The earnings of six or eight varying jobs that are closely comparable with those rated in the given plant may be ascertained from other companies in the community. These will establish a trend line which will show the correlation of the general run of wages in dollars with the point ratings. Some companies use a straight line for the trend, others, as is shown on page 408, use the method of least squares for locating the line. The wages for the other jobs on the schedule may be arrived at by interpolation.
3. A study of the cost of living within a given community may

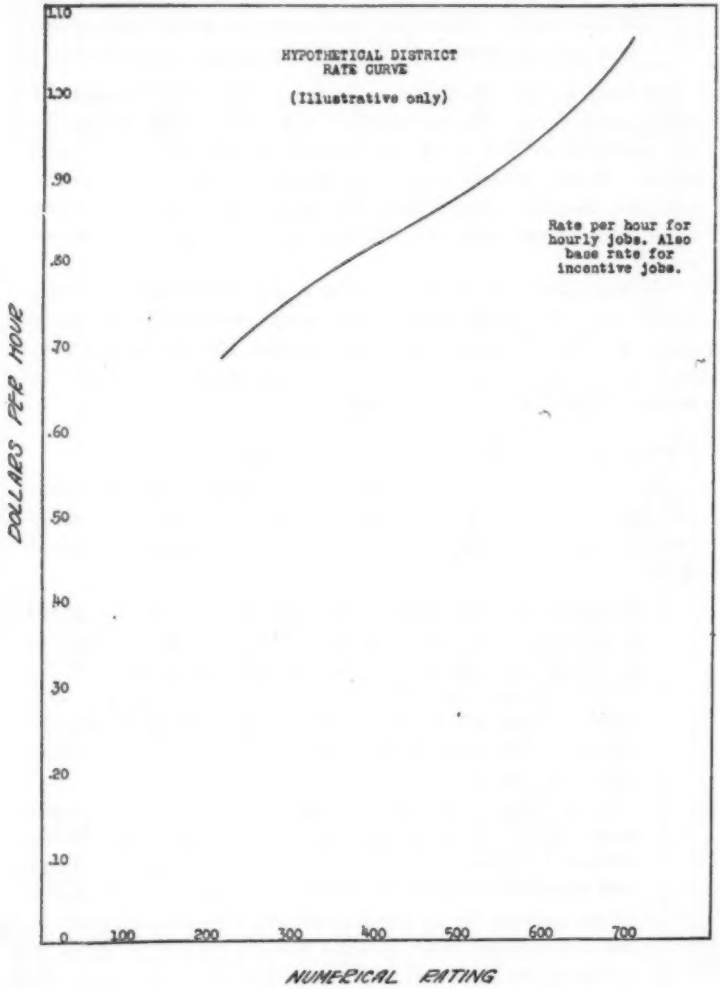
HYPOTHETICAL DISTRICT
RATE CURVE
(Illustrative only)
Rate per hour for hourly jobs. Also base rate for incentive jobs.
DOLLARS PER HOUR
1.10
1.00
.90
.80
.70
.60
.50
.40
.30
.20
.10
0
100
200
300
400
500
600
700
NUMERICAL RATING

EXHIBIT 3

be made. From these figures, some form of budget such as "Minimum for Health and Decency," or, "American Standard of Living," may be worked out which will show what to pay for a minimum wage. The other jobs may be graded up from this. This system may be used if a company wishes to be sure that the wages paid are enough.

In *Wages, A Means of Testing Their Adequacy,*[13] this subject is given an excellent and complete treatment. A system of graduated budgets according to size of family, has been worked out and also a method for finding average age at hiring, marriage, and increase in family size; in this manner, these budgets are checked with actual salaries, both as to age and length of service, to see if they are adequate.

All three of these systems are in use, apparently successfully, yet method number 2 seems to be the most common. If this is used, care must be taken that the jobs are truly comparable as to duties and conditions, or adjustments must be made.

The Job Schedule and Its Use

After rating, the jobs may be arranged in the form of a schedule from least to most difficult. On page 410 will be found a job schedule as set up by a small company in cents per hour. This company has determined the upper and lower limits for each class of work and uses employee ratings to determine where, within a certain class, each man falls.

[13] C. Canby Balderston and Morris E. Leeds, *"Wages, A Means of Testing Their Adequacy"* (Pennsylvania Press, 1931).

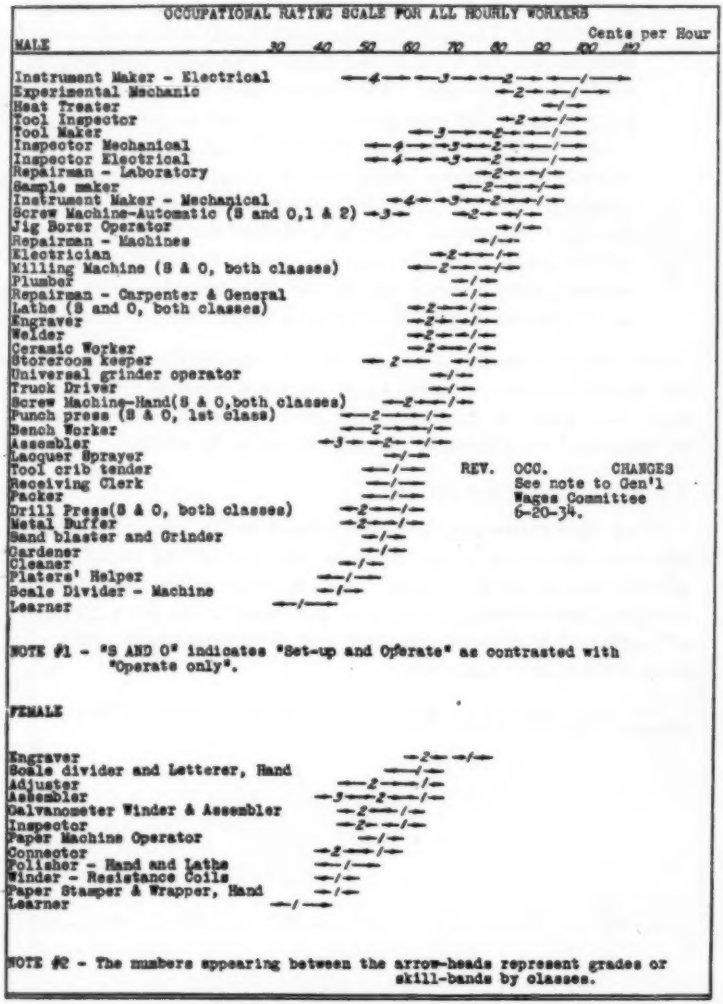
OCCUPATIONAL RATING SCALE FOR ALL HOURLY WORKERS
Cents per Hour
MALE
30 40 50 60 70 80 90 100 110
Instrument Maker - Electrical
Experimental Mechanic
Heat Treater
Tool Inspector
Tool Maker
Inspector Mechanical
Inspector Electrical
Repairman - Laboratory
Sample maker
Instrument Maker - Mechanical
Screw Machine-Automatic (S and O,1 & 2)
Jig Borer Operator
Repairman - Machines
Electrician
Milling Machine (S & O, both classes)
Plumber
Repairman - Carpenter & General
Lathe (S and O, both classes)
Engraver
Welder
Ceramic Worker
Storeroom keeper
Universal grinder operator
Truck Driver
Screw Machine-Hand(S & O,both classes)
Punch press (S & O, 1st class)
Bench Worker
Assembler
Lacquer Sprayer
Tool crib tender
Receiving Clerk
Packer
Drill Press(S & O, both classes)
Metal Buffer
Sand blaster and Grinder
Gardener
Cleaner
Platers' Helper
Scale Divider - Machine
Learner
REV. OCC. CHANGES
See note to Gen'l Wages Committee 6-20-34.
NOTE #1 - 'S AND O' indicates 'Set-up and Operate' as contrasted with 'Operate only'.
FEMALE
Engraver
Scale divider and Letterer, Hand
Adjuster
Assembler
Galvanometer Winder & Assembler
Inspector
Paper Machine Operator
Connector
Polisher - Hand and Lathe
Winder - Resistance Coils
Paper Stamper & Wrapper, Hand
Learner
NOTE #2 - The numbers appearing between the arrow-heads represent grades or skill-bands by classes.

EXHIBIT 4

Below will be found a job evaluation summary sheet as used by a large corporation. The letters at the head of the columns stand for common job factors which are:

1. Mental requirements
2. Skill
3. Responsibility
4. Mental application
5. Physical application
6. Working conditions.

JOB EVALUATION SUMMARY

Code		Points M	S	R	MA	PA	WC	Total
*0705	Guteman, Directs Visitors	35	60	25	20	0	0	540
0705	Watchman, Unif. Patrol, Traffic	35	60	25	20	15	10	565
0910	Crane, 30 to 200 T. Sin. Hook	35	80	45	25	5	0	590
*0910	Crane, 200 T. Double Hook	35	120	70	30	10	0	665
0931	Truck Driver, Gas, Plant	20	60	35	20	15	10	560
0931	Truck Driver, Gas, Licensed	35	100	45	25	15	10	630
*0932	Truck Driver, Shop, Elec	20	60	20	20	20	0	540
*1100	Electrician, 1st, Leading Man	80	260	60	30	25	20	875
*1225	Plumber & Steamfitter, 1st	60	240	40	25	30	25	820
1234	Machinist, 3rd, Ordinary Repairs	50	200	35	10	30	10	735
1234	Machinist, 2nd, Large Machines	65	240	40	20	30	10	805
*1234	Machinist, 1st, Diagnose	80	280	55	30	30	10	885
*1260	Sheet Metal, 1st, L/O Develop	65	240	30	30	25	15	805
*1263	Carpenter, 1st, Finish Work	60	220	25	30	25	20	770
*1301	Laborer, Inside	5	20	5	10	40	0	480
*1302	Sweeper, Sweep, Remove Chips	0	0	0	5	35	0	440
1306	Janitor, Office, Lavatory	20	20	10	10	15	0	475
2000	Bor. Mill, 3rd, Rough & Fractional	50	160	20	15	25	0	670
2000	Bor. Mill, 2nd, Loco. Wheels, Spiders	70	220	40	25	15	0	770
*2000	Bor. Mill, 1st, 16′ Stator Frame	85	280	70	40	10	10	890
2102	Planer, under 7′ Motor Frames	50	180	45	25	15	10	725
*2102	Planer, 7′ and over Fab. Frames	70	240	60	35	10	10	825
2303	Lathe, Eng. 3rd, Rough off Stock	30	80	5	15	10	5	545
2303	Lathe, Eng. 3rd, for Grind	50	180	20	20	10	5	685
*2303	Lathe, Eng. 1st, Intricate	70	240	30	30	10	5	785
*2401	Screw Mach. Auto. No Set Up	35	80	10	20	20	5	570
*2401	Screw Mach. Auto. Die Head & S. U.	60	220	30	30	20	5	765
*2420	Lathe Turret, Irreg. Complic	60	220	30	30	15	5	760
*2430	Screw Mach. Bar Mic. & S. U	60	200	30	30	20	5	745
2502	Milling Machine, Clearances	20	100	10	10	15	5	550
2502	Milling Machine, Fractional	25	120	15	10	15	5	590
2502	Milling Machine, In Fix. Close	35	160	30	20	15	5	665
2502	Milling Machine, Irreg. Close	50	180	30	20	15	5	700
*2502	Milling Machine, Ordinary, Index	60	220	30	30	10	5	755
2502	Milling Machine, Complic. Index	60	240	35	35	10	5	785
2703	Drill Rad., Clearance Holes	20	80	10	10	20	5	545
2703	Drill Rad., Med. Jig Work	35	140	20	15	20	5	635
*2703	Drill Rad., Compl. L/O	50	160	25	20	20	5	680
*2721	Drill Sensitive, Compl. Layout	40	140	20	20	20	0	640
2721	Drill Sensitive—Simple	10	20	0	5	20	0	455
2930	Grind Precision, 2nd, Arm. Sh	50	180	35	20	20	5	710
*2930	Grind Precision, 1st, Gas, Eng. Cr.	60	220	40	25	20	5	770
*3000	Punch Press 80-150 Arm. P	35	80	25	20	30	15	605
3000	Punch Press over 200, Irreg	45	140	60	20	30	15	710
3001	Punch Press, Repet, Strip or Roll	20	60	0	10	30	0	520
3900	Assem. Bench, 2nd, General	40	160	25	25	25	0	675
*3900	Assem. Bench, 1st, Fit, Scrape, etc	60	220	35	30	20	0	765
3910	Assem. Conveyor, Simple	10	40	0	0	30	0	480
*4300	Assem. Floor, 1st, Align, Large	60	200	40	30	30	5	765
4511	Tool Maker, 3rd, Templates	65	220	45	20	20	0	770
4511	Tool Maker, 2nd, Compl. Fixtures	85	260	45	25	20	0	845
*4511	Tool Maker, 1st, Compl. Jigs	90	320	50	40	20	0	920

From this job schedule, charts of advancement and promotion may be readily developed. Since such charts have been developed and discussed elsewhere,[14] they need not be more than mentioned here.

These charts, together with the job schedule as mentioned above, will accomplish the following:

1. Show relative value of positions.
2. Define lines of organization and responsibility.
3. Serve in making salary adjustments and discovering radical variations.
4. Establish a basis for comparing company with outside rates of pay.
5. Facilitate recognition of merit and promotion, thus stimulating ambition.
6. Facilitate setting lines of job progression so that future executives may have a well-rounded experience background.
7. Furnish a basis for training employees for greater efficiency and positions of greater responsibility.

Wage Adjustments

After all jobs have been rated, they should be plotted against the standard rate curve as shown on page 408. Many rates will be found slightly out of line with the new standard, some markedly. It is a simple matter to adjust upward those below the curve.

Those jobs decidedly above the curve may be there because of length of service, size of family, or some other personal reason. This should not invalidate ratings. The schedule of jobs will serve a very definite purpose here in pointing out which are blind alley positions. It should serve as a guide for transfer and promotion. A definite effort should be made to educate the men whose wages are not adequate to a point where they may be moved to a position in the next higher wage bracket in order to earn enough.

During this training period, the jobs which are above standard may be circled in red on the chart so that they will not be forgotten. Unless there is good reason for reducing certain men's

[14] Scott, Clothier & Mathewson, *Op. Cit.*

pay immediately, it would be best to wait until there is a general wage change and then bring their rates into line.

While availability of a given class of labor may temporarily necessitate the payment of rates in excess of real values, such rates should not be allowed to distort the relative point value or rating of one job to another. The rate required to pay certain jobs by the law of supply and demand, or for some other special reason, should be treated as exceptions and be readjusted when conditions warrant.

Another method of handling rate adjustments for men whose pay is out of line because of personal reasons, is to have at stated intervals, say, twice a year, a cash bonus. When distributing this bonus, only those factors which do not directly affect the job, such as years of faithful service, old age, size of family, and other extraneous items, may be considered and the bonus distributed on this basis. Thus, the older workers need not suffer and the standard base rates will not be upset because of "man" rather than "job" considerations.

Summary of General Procedure in Job Evaluation

1. Motion-time study for standards of output and procedure
2. Job analysis and specification for job requirements
3. Job evaluation for job worth
   - (a) Pick job evaluation committee.
   - (b) Determine factors common to all jobs.
   - (c) Determine weights for these factors.
   - (d) Devise job evaluation manual and/or rating sheet.
   - (e) Rate the jobs.
   - (f) Convert the ratings into monetary values.
   - (g) Develop a job schedule.
     1. Promotional charts
   - (h) Adjust wages which are out of line.

Summary and Conclusions

In order that the reader may have a clearer picture of the salient points already covered, the remaining space will be devoted to a summary of what has gone before, together with certain conclusions which may be drawn from this presentation.

Job evaluation has to do with jobs and not men. It is a method for determining the relative worth of each job. This job worth is that portion of the total wage which is paid for the occupational requirements and is known as the base rate.

Before base rates can be determined, it is necessary that a thorough job analysis and specification be undertaken. It is also necessary that standards of output and procedure, as determined by motion-time study, be known. This is important because the amount of skill, mental and physical effort, etc., cannot be truly evaluated unless job conditions and output standards are set at a fair and logical value first.

It should be evident from the previous discussion that no one man or department should have entire charge of evaluating jobs. Only through the combined judgments of a group of competent men can these evaluations be justified. The detailed work may be done in one department by questions of policy and evaluation of key jobs should be done by a committee.

The mere rating of jobs without consideration of the fundamental factors involved will yield but superficial results at best. The common factors, together with the weights assigned to each, must be determined by the committee. The next logical step is the development of rating sheets and/or manuals as indicated on pages 404 and 405.

Rating the key jobs and indicating to what extent each factor is present will follow. After these point ratings are secured, it is necessary to convert them into monetary values. A rate curve, labor cost as budgeted, or a study to determine minimum wages necessary to maintain an average family in health and decency, may be used to convert these point ratings into dollars and cents.

The job schedule, together with promotional charts, may be developed as a logical outcome of this work, resulting in definite improvements in employee morale and efficiency. At this time it is also essential that policies in regard to rate changes (made necessary if this evaluation of jobs is to be of real worth) be determined. For those employers who desire to make an allowance for employees who more than fulfill the job requirements, an employee rating plan at regular intervals is the answer. Factors such as quality of work, versatility, and initiative, may be considered. A certain maximum, such as 10 per cent of the base

rate, may be allowed. The portion of this which will be assigned to each man is determined by the employee rating. This, however, is outside job evaluation and, therefore, is only mentioned here.

In conclusion, it may be stated that for the individual plant, the objectives of job evaluation will become a reality if the procedure as herein indicated is followed. Results to be expected are as follows:

1. A complete, accurate and impersonal description of all classes of work within the plant will have been obtained.
2. The relative value of all jobs within the plant will be known.
3. Lines of organization, responsibility and channels of authority will be more clear.
4. Job information in convenient form for the use of the employment office, in both initial employment and transfer possibilities, will be available.
5. Fair maximum and minimum salaries for each position will be known.
6. Salary adjustments will be facilitated and inequalities in wage payment will become obvious.
7. A basis of comparison when checking company wages with those paid generally for the same kind of work in the community or industry will have been realized.
8. Employee ambition will be stimulated because of recognition of merit and promotion to positions of larger responsibilities on this basis.
9. Job evaluation, through the job schedule, will facilitate setting lines of job progression, so that when an employee attains a position of high responsibility, his experience background will be as rounded as possible.
10. The two aforementioned results will furnish a basis for training employees for greater efficiency and for positions of greater responsibility.

It seems decidedly possible that job evaluation can be used throughout industry, regardless of size or type of company. Naturally, there should be adjustments to fit individual conditions —but the basic principles as herein outlined are sound.

When job evaluation is applied on an extensive scale, and when trade associations in their capacity of a co-ordinating agency take part in this work, these further benefits may be realized:

1. The determination of similar names and definitions of jobs so that rate and employment data can be more easily and accurately collected.
2. The standardization of labor as well as other costs. This will assist trade associations in voluntarily policing their industries in regard to fair trade practices toward labor (provided interference from governmental agencies can be avoided) and thereby make possible the elimination of unfair competition from the sweatshop type of employer.
3. The improvement of labor relations in industry as a whole. Misunderstandings will be avoided because organizations will be able to put their houses in order before unionization "freezes" the relative rates of pay.
4. The development and possession of information that will enable businesses to deal more fairly with labor organizations—and know what they are talking about.
5. The creation of conditions that will be conducive to greater stability for industry and greater security for labor.

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